Remarks

Claims 1 through 13 remain pending in the application.

The Office Action rejects Claims 1 through 13 as directed to non-statutory subject matter under the assertion that Claims 1 through 13 cite a process, device and medium for transforming data in accordance with a mathematical algorithm without disclosing a practical/physical application. The Office Action further asserts that claims 1 through 6, 12 and 13 are not directed to a machine or apparatus and device and Claims 7 and 9 are not directed to any specific hardware component to realize the implementation and are thus considered as software per se. Claims 1 and 8 are amended to define a process carried out by a computer and including the steps of executing instructions that cause the computer to decompose the transformation matrix, the rotation matrix and the auxiliary matrix and to determine the transforming element. Therefore, claimed inventions in claims 1 and 8 as amended are applied to a particular machine, a computer, and the subject matter of the amended claims may be considered statutory subject matter. Accordingly, the Applicant respectfully requests withdrawal under 35 U.S.C. §101.

With regard to claims 7 and 9, the amended claims are directed to a specific device, namely a computer system. A computer system is not software per se and therefore amended claims 7 and 9 are directed to appropriate subject matter. Claims 10 and 11 are directed to a computer readable medium that a person skilled in the art would clearly recognize as a physical medium such as a computer readable disk. A physical component such as a computer readable disk is appropriate

statutory matter. Therefore, claimed inventions in the claims as amended produce tangible results, and the subject matter of the amended claims may be considered statutory subject matter. Accordingly, the Applicant respectfully requests withdrawal under 35 U.S.C. §101.

The Office Action rejects Claims 1 through 13 as anticipated by Geiger, et al., Audio Coding Bases on Integer Transform, Audio Engineering Society Convention Paper, 5471 (Sep. 2001) under the assertion that Geiger discloses a process for determining a transforming element for a given transformation function having a transformation matrix and corresponds to a transformation of a digital signal from the time domain into the frequency domain or vice versa wherein the transformation matrix is decomposed into a rotation matrix and an auxiliary matrix which, when multiplied with itself, equals a permutation matrix multiplied with an integer diagonal matrix. The Office Action further asserts that the rotation matrix and the auxiliary matrix are decomposed into a plurality of lifting matrices and the transforming element is determined to comprise a plurality of lifting stages which correspond to the lifting matrices.

The cited reference does not disclose all limitations of the claimed invention. Geiger does not disclose an auxiliary matrix which, when multiplied with itself, equals a permutation matrix multiplied with an integer diagonal matrix. Instead, Geiger discloses the Givens rotation of $\begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix}$. This Givens rotation, when multiplied by itself, is equal to the

following matrix A: $\begin{pmatrix} \cos^2\alpha - \sin^2\alpha & -2\sin\alpha\cos\alpha \\ 2\sin\alpha\cos\alpha & \cos^2\alpha - \sin^2\alpha \end{pmatrix}$. If α is a multiple of pi/2, then matrix A would become either $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, an identity matrix, or $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$, a negative identity matrix. Further, Applicant respectfully disagrees with the assertion that because neither the definition nor the specific permutation matrix is provided in the claims, the permutation matrix can be considered a matrix that would invert the space domain which alters the original matrix from the positive pace domain to negative space domain.

Applicant's process claims that the transformation matrix is decomposed into a rotation matrix and an auxiliary matrix which, when multiplied by itself, equals a permutation matrix multiplied with an integer diagonal matrix. Although the claims do not disclose the specific matrix of each claiming matrix, the "rotation matrix", "permutation matrix" and "integer diagonal matrix" are well defined terms in the art and a person skilled in the art would have no difficulty understanding what these terms define. An "auxiliary matrix" is not a general term of art but is instead defined to be a matrix which, when multiplied with itself, equals a permutation matrix multiplied with an integer diagonal matrix. Applicant has attached printouts from the Wikipedia online dictionary that define the terms "rotation matrix", "permutation matrix" and "integer diagonal matrix".

Further, it is well defined in the art that a permutation matrix is a square binary matrix that has exactly one entry "1" in each row and each column of "0's" elsewhere. Each such

matrix represents a specific permutation of m elements and, when used to multiply another matrix, can produce that permutation in the rows or columns of the other matrix. Thus, based on the common knowledge of the definition of a permutation matrix, neither the identity matrix nor the negative identity matrix could be understood to be a permutation matrix. The negative identity matrix is not a permutation matrix because the mapping of numbers from positive to negative completed by multiplication with a negative identity matrix is not considered to be a permutation due to the fact that such mapping does not change an order of elements and because a negative identity matrix is not comprised only of "1's" and "0's" which a person skilled in the art would consider to be a typical characteristic of a permutation matrix. A permutation matrix is clearly defined in the art and a person skilled in the art, when reading the claims and the specification, would only understand it is a way consistent with the definition of a permutation matrix in the art. Thus, the permutation matrix cannot be considered to be a matrix invert in the space domain, which alters the original matrix from the positive space domain to negative space domain. As such, because the identity matrix or the negative identity matrix cannot be considered a permutation matrix Geiger does not disclose an auxiliary matrix which, when multiplied with itself, equals a permutation matrix multiplied with an integer diagonal matrix. Therefore, the cited prior art does not anticipate the claimed invention.

Claims 2 through 6 depend from Claim 1 and for the reasons discussed above, Geiger does anticipate these claims.

The Office Action rejects Claim 8 as anticipated by Geiger under the assertion that Geiger discloses a method of

transforming a digital signal from the time domain into the frequency domain or vice versa using a transforming element wherein the transforming element corresponds to a given transformation function, which transformation function includes a transformation matrix wherein the transforming element is determined by a process including decomposing the transformation matrix into a rotation matrix and an auxiliary matrix which, when multiplied with itself, equals a permutation matrix multiplied with an integer diagonal matrix. The Office Action further asserts that Geiger discloses decomposing the rotation matrix and the auxiliary matrix each into a plurality of lifting matrices and determining the transforming element to comprise of a plurality of lifting stages which correspond to the lifting matrices, each lifting stage including the process of sub-blocks of the digital signal by an auxiliary transformation and by a rounding unit.

As discussed above, Geiger does not disclose an auxiliary matrix which, when multiplied with itself, equals a permutation matrix multiples with an integer diagonal matrix. Geiger only discloses an identity matrix or a negative identity matrix and not a permutation matrix. Therefore, Geiger does not anticipate the applicant's claimed invention.

The Office Action rejects Claims 9 through 13 for the same reasons Claims 1, 3, 4 and 8 were rejected. As argued above, Geiger does not disclose the claimed invention and for these same reasons, Geiger does not anticipate Claims 10 through 13.

Conclusion

This response has addressed all of the Examiner's grounds for rejection. The rejections based on prior art have been traversed. Reconsideration of the rejections and allowance of the claims is requested.

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